This event was kindly co-sponsored by the eMalta Commission and MITTS.

DRAFT REPORT

eFORESEE Workshop on Exploring Scenarios in ICT

Villa Bighi, Kalkara, Malta

29-30 August 2002

Thursday, 29th August 2002

The workshop started with a brief intro by Dr J Harper on how the workshop would be organised, namely, that the afternoon would focus on identifying Information Society trends of relevance to Malta. The next day, there would be a presentation by Ms Yasmeen Ariff, the ICT Panel Technical Secretary on the scenarios presented to date using mind-mapping tools. This would be followed by an introduction to scenarios methodology by Prof Miles. The participants would then split into three groups to tackle the scenarios.

Prof Ian Miles presented key ICT and information society trends – here below we have presented some highlights – for details, please consult the powerpoint presentation and two background docs provided by Prof Miles (see malta 2002.ppt; ILOshort.doc; karlsruhe2000.doc available from file area).

Highlights from Prof Miles' presentation

What is the information society?

- Cultural change
- Knowledge-based
- Technology revolutions

Technology has brought about qualitative as well as quantitative changes. Freeman distinguishes between :

- Incremental innovations (often emerge from on-the-job itself)
- Radical innovations (often emerge from research)
- Technological revolutions (emerges from need for a completely new approach)

A number of observers see ICT as constituting a new technological revolution. It is important not to see the technology itself, but attractive ways of using it. A technology is revolutionary, if it has the following features:

- Cheap
- Unlimited supply
- Potential all-pervasiveness
- Capacity to reduce costs of capital, labour, products

Three revolutionary technologies may be identified:

- Information technology
- Biotechnology
- Nanotechnology

ICT as a revolutionary technology, has the following features:

- Dramatic and continuing : power increasing (new capabilities) and cost decreasing.

- Widespread applicability (in the economy…new ways of working, organising, living). It is also generating further development on what works and what doesn't.
- No resource limits (human resources and skills are somewhat limited).
- Little social resistance.
- Actors' perceptions: the results of the new ICT revolution should be reflected in increases in productivity, i.e. opportunities seized to produce new products and processes, new practices, "common sense". In the US, there have been increases in productivity but in Europe there is no evidence of this. Maybe the statistics are wrong?!!
- Element of novelty makes information processes attractive

In the discussions and surveys carried out in the 80's on what would be the impact of ICT in the future, the questions which were actually asked were completely off the mark. Key developments like hacking activities, large-scale were underplayed (not foreseen), e.g. the mobile revolution was completely missed.

Some questions to consider now about ICT revolution in the future:

- beyond miniaturisation??
- Capabilities will continue to grow??
- Growth in Internet use – digital divide: internet gap may close but other gaps may emerge??
- Use of internet via mobile devices (ref: IPTS Technology Roadmap)
- Solving bugs in software: big business 60 billion US dollars
- Being able to repair old systems and software
- Management and operational level : skills

Arguments for and against technology:

- Speed and scale of change
- Continuity – emphasis on social determinism
- Transformation – emphasis on technological determinism
- Liberation, concord vs. control and conflict
- Structuralism – there are incredible new opportunities for organising but their take-up will be constrained by existing structures. Interplay of different forces working together.

ICT's features:

- Dataprocessing
- Data capture, sensors, inputs
- Display, information outputs
- Actuators
- (Tele)communication
- storage – digitalisation – software and services
- physical limits seem to be reducing more and more
- huge role of contained costs
- wealthier sections of society taking up new technologies faster (slower take-up by women and poor)

Bottlenecks:

- one bottleneck – SMEs need third party to help out with access problems
- software, services, content skills
- broadband telecoms/ mobile telecoms
- security issues and emerging threats (e-payments; cyberwar)
- establishment of standards
- continual access problems

Move from ICT to information society. Information society has evolved :

- islands (separate, individual, massive repositories of infinite processing power)
- archipelago (clusters of islands that are linked together)
- continent (late 80's and 90's : development of the web- investments in networking and learning). A "technology is moving with you" concept.
- ecosystem (we are moving towards this now): " Technology all around you" - developing new business processes, it's not the technology which brings about change, but the innovative use of the technology to bring about change.

Ecosystem indicates an environment where systems interact in a seamless way through intercommunicating devices, where useful and socially acceptable applications have been generated. The future of ICT seeks to develop useful and socially acceptable applications.

Discussion:

Dr Vicky-Anne Cremona raised a number of concerns related to the use of the words 'structuralism' and 'ecosystem' and her fears that the scenario presented was one where we would be living in a controlled environment (ambient intelligence). It was agreed that while ICT can be used to overcome more mundane tasks (e.g. remote unlocking of gates thru smart devices), it is important that we still retain the possibility to switch off the controls when we want to. The ecosystem scenario seemed to focus more on maturity of the technology rather than maturity in its use /applications, e.g. sustainable development…

Mr Joe Woods raised a very valid point regarding space – it is important that the preferred scenarios are about increasing space whether it is individual space, national space ….. Encouraging the initiative of others is a space-generating activity. This could help us to overcome the 'ghetto' mentality. Joe also raised the important distinction between stable and unstable structures (also mentioned in Prof Miles' documents) – the idea that we should not necessarily be concerned with promoting stable structures in what is emerging as an increasingly unstable context.

Prof Miles highlighted the importance of wild card analysis, i.e. identifying improbable but not impossible events. For Malta, the upcoming elections and their implications for Malta's future is a case in point.

Prof Miles also highlighted the importance of links with cities for Malta, because of similarities in size and scale e.g. interesting parallels with city of Manchester.

The discussion then turned to EU membership and how the related benefits have been linked primarily to financial gain rather than the original 'community' aims of the founding fathers……

Friday, 30th August 2002

A document prepared by Prof Miles, outlining the objectives and agenda for Friday's session, was circulated among the participants (see Annex 4).

Presentation by Ms Yasmeen Ariff
Ms Yasmeen Ariff gave a brief summary of the issues raised in the on-line discussions by the expert panel members (see Annex 3).

Here are a selection of the scenarios identified to date in the eFORESEE ICT mailing list discussion:

- Cliff Edge Scenarios (Elephant island, Malta Yuk, Neolithic Malta.
- Virtual tourism
- Hubmed
- ICT Industry (self-sustaining, copycat, dinosaur)
- Malta as a centre of excellence for open source software
- Malta as a hub in the provision of services
- Malta as a service provider to the games industry
- Malta Status Quo
- Malta as a Centre for the creation of a European knowledge-based society
- Malta as a Cente for Euro-African Links
- Malta as a distance learning e-hub
- Malta as a hub for data-mining services
- Malta as a centre for seamless health care (telemedicine)
- Malta as a Centre for Thinking Skills, Innovation and Leadership
- Malta as a centre for individual learning
- Malta as a Centre of Excellence for ICT in education
- Malta as a Centre for Knowledge-based technologies and applications
- Malta the Smart Island

Presentation by Prof Ian Miles on Scenarios (see powerpoint presentation and doc).

Working through multiple scenarios allows us :

- To examine plausible futures
- To see what are the factors driving the scenarios
- To encourage people who are stuck in their own boxes to discuss and interact
- To identify potential actions and potential indicators and turning points
- To define strategies and tools and their 'robustness'

There are different types of scenarios:

- **Exploratory** (these scenarios start from where we are now and what will happen if …..). "Outward Looking".

- **Normative** (these scenarios start from the future, from a desirable vision of where we want to go and developing the tools and strategies to get there. "Inward Looking" The focus is on identifying success scenarios. We can also start from negative scenarios and create systematic approaches)

Exploratory Approach:

- Identify key trends and issues
- begin with the process of discussion and run through a number of factors:
  e.g. environment, economic issues ….
- Identify 3 to 4 top drivers and identify scenarios and ask 'what if' in function of these

a) begin with 4 archetypal scenarios
b) interviews
c) determine the stakeholders

The 4 archetypal scenarios are:

a) **business as usual** (surprise-free, best guess)
b) **hard times** (major challenges but not catastrophic collapse)
c) **onwards and upwards** (successful mastery of current trends, do better)
d) **visionary/ paradigm shift** (alternative directions).

How to characterise scenarios:
5 to 6 words or phrases to describe the main features – current trends, policies…

Prof Miles then invited the participants to identify the key features for the four scenarios. The results of this brainstorming are presented below:

Scenario 1: Business as Usual (BaU)

- Fragmented industry – small players and a few big players
- Dots not joined up
- Too localised, inward-looking, short-term
- No clusters, no focus
- Not enough expertise (but plenty of generic skills)
- Dependence on foreign trends
- Slow to change
- Highly competitive market, dimishing opportunities
- Lack of innovation
- Polarisation
- Investment in children's skills should pay off
- High literacy
- Increasing technological know-how but lack of business models
- Pockets of entrepreneurship
- Technological infrastructure featuring steady improvement

Ian's Summary on BAU Scenario

- High levels of skills
- Good social and technical infrastructure
- Slow progress in
    - ⇒ overcoming fragmentation, fostering innovation and entrepreneurship, linking different policy areas.
    - ⇒ generating new visions (for Malta and the region)
    - ⇒ private investment for new trends (local and FDI)

Scenario 2: Hard Times

- All of the BAU trends persist, interact and get worse
- Increasing financial problems, lack of public funding
- Lack of partnership between major players (public-private-community partnership divide)

Scenario 3: Onward and Upward Scenario

- Malta making the best use of human resources to attract investment
- ICT services dominate exports
- Academia-industry collaboration
- Human resources attract investment
- Research and innovative effort is normal
- Better climate for innovation, implementation
- Financial problems are resolved / alleviated; venture capital influx
- Accountability and responsibility
- Teleservices and virtual services ease pressure on infrastructure
- Move up value chain
- Improved infrastructure
- Improved quality of life

Scenario 4: Visionary/ Paradigm Shift

- Social experiment and learning to breach digital divide and encourage new uses
- Visionary e-government
- Active involvement of SME communities in e-commerce
- Virtual distributed companies
- E-business
- Private sector led by SMEs
- Malta pioneering certain ICT applications (e.g. smartcards)
- Shift from mass tourism to high value
- Quality of life-oriented tourism
- Malta's ICT industry as a big player in transferring best practice in ICT developments, information society
- "Greater Malta" – Maltese diaspora networked, forging new identities and providing a greater market for Maltese content e-goods and services
- Heritage protected and valorised
- Beyond Skart
- Learning – Malta at the forefront of e-learning and more open and flexible learning systems.

There was a heated discussion on government-led and industry-led ICT development in Malta and its historical context.

Three normative scenarios that could be explored later in the pilot (proposed by Ian) are:

- **Government-led**
- **ICT industry-led**
- **Social +business-led**

The participants were divided into three groups to tackle the following scenarios:

Group A: '**Hard Times'**
Rapporteur: Ms Angele Giuliano
Members: Ms Isabelle Bonello, Ms Patricia Camilleri, Dr Aldo Drago, Ms Lisa Pace, Ms Celia Vella, Mr Paul Galea.

Group B: **'Onward and Upward'**
Rapporteur: Dr Vicky-Anne Cremona
Members: Mr Brian St John, Mr Jesmond Xuereb, Ing Ray Muscat, Mr Mathew Scerri, Mr Cedric , Mr Wilfred Kenely

Group C: **'Paradigm Shift'**
Rapporteur: Ms Yasmeen Ariff
Members: Ms Sandra Dingli, Mr Steve Attard, Mr Ian Bonello, Mr Mike Rosner, Dr Simeon Deguara, Mr Joe Woods

The teams were given two sets of tasks (see Doc 2) but the group discussions continued throughout lunch and work on the two tasks was effectively merged as a result. The scenario-development process generated so much interest that it was difficult to get the

groups to stop discussing. The results were not only interesting and entertaining but also provided important insights into the key drivers. Here are the scenario narratives.

‘Hard Times’ – APOCALYPSE SOON! or APOCALYPSO (Ian’s suggestion)

- Persistance of the current situation especially the fragmentation in industry, government, organisations
- The baggage of a 1000 years…
- We cannot share and network if we have never been taught to do this.
- No teamwork at all levels
- We cannot blame youngsters if we do not teach them
- Limited space …. Feel threatened
- No one is doing any sharing
- Brain drain
- Unutilised capacity of ICT investment and in education, e.g. h/w in schools ??
- Lack of R&D

Our scenario:

Malta is sidelined - no active participation anywhere in the world. Not forming part of the global knowledge economy. Countries are developing and Malta is left behind. We become a third world country again. We never get there – we remain in the developing phase. We are always lagging behind. There is no research or innovation.

Education’s outlook is bleak. University becomes outdated as there is no funding of programmes. State funding diminishes. Students have to pay to study – education is not free anymore. There is a non-utilisation of skills. Students become slowly worse. Students are given a mish-mash of knowledge and thus they only know a bit of everything but are experts of nothing. The implication is that there will be no real expertise in Malta and no centres of excellence in any topic.

This was a trend that we though might emerge since already there is a lot of fragmentation even in study disciplines but the courses available try to take the best of all worlds and do not concentrate enough on "pure" topics.

The Drivers of this scenario are:

- The infrastructure is a problem – drainage, power and electricity and waste management
- Tourism suffers – just old people come to Malta. Mega-melanoma problems – tourists put off going for holidays in the sun. This undermines our tourism industry and 50% of GDP disappears. Tourist operators decide to leave Malta out of their promotions.
- ST- Microelectronics leaves Malta to go to Tunisia – this marks the end of the Maltese economy.

- Malta has a bad image overseas and people do not want to come and live, work or play here.

- We do not know how to tap EU funds.
- The decision-makers do not give due importance to ICT, e.g. MDC and the banks,
- There is no investment in ICT.
- Political parties continue to undermine each other's policies. Unstable government
- If we're out of the EU, we're all done.
- Or if we're in the EU, we do not adapt to the new system, we're not heard and we're a non-entity.
- Downward spiral due to financial problems
- A credit-based society
- A throw-away society

Onward and Upward Scenario : A Forward-Looking Malta

We were happy with the scenario but decided to develop certain aspects further.

- Malta is competitive, a leader in ICT with good quality of life, cares for the social and economic aspects and encourages the generation and fostering of ideas.

(Because the boundaries in the STEEPV are not clear, the team adopted a classification according to drivers and shapers).

1. The relationship between academic and industrial spheres is strong and features :

   ⇒ 2 types of research : pure research and research catering for industry's needs
   ⇒ academia moves from being simply a "teaching" institution to one that generates income (this income can sustain areas less directly linked to industry : "arts incubators"
   ⇒ the training provided by University is quite adequate in certain areas (not all!!). Standards are maintained and updated by focusing on international benchmarks.
   ⇒ Cross-flow of ideas between faculties and departments. Look for innovative type of collaboration even through non obvious links/ partners.
   ⇒ Encourage the setting up of a private university to foster intellectual competition and inter-university distance-learning
   ⇒ Joint public-private run research institutions
   ⇒ Develop a proper policy for intellectual property rights
   ⇒ Adjust stipend system

2. Development of the sectors of research and innovation

⇒ Each sector defines a vision and includes the community in its definition.
⇒ There is a clear industrial/enterprise policy and innovation policy involving government and industry
⇒ There is a research (science and technology) policy (also covering non-S&T research areas)
⇒ Government invests in research and development.
⇒ The community is aware of the added value research initiatives bring.
⇒ There is a focus on a small number of priority areas for research and innovation in industry :
    - ICT
    - Biotech
    - Renewable energy (the problem of power interests and structures is resolved)

3. Human Resources

⇒ There is training at all levels
⇒ Re-thinking of the educational system
⇒ Ideas are applied better and there are watchdogs to monitor and provide direction on problem areas.
⇒ The top-down mentality (even in public awareness and diffusion) is eliminated.
⇒ Focus on science-based subjects with serious investment in science teachers
⇒ A creative approach is instilled : lateral thinking and thinking out of the box.

4. Social Level

⇒ There is a social debate about value of technology and how to use it
⇒ Change of mentality where more costly approaches (eg initiatives to safeguard the environment) are seen as 'assets' rather than 'costs'.
⇒ More maturity among social partners
⇒ Rethinking of political transparency and political system – bi-polar mentality is eliminated and there are long-term common policies developed between the parties.

5. Competitiveness

⇒ The infrastructure is improved
⇒ Cooperation develops between local companies
⇒ Clusters develop
⇒ The right funding arrangements are available.

Paradigm Shift Scenario: Go.Malta.Go (Global Malta/IT-friendly Malta)

Malta is a showcase to propagate ideas and experiments in education. The appropriate support structures and enabling environment have been put in place.

Features/ Values:

⇒ Trusty
⇒ Flexible (human resources)
⇒ Small is beautiful
⇒ Creativity
⇒ Community spirit and collaboration
⇒ Maximising on Malta's entrepreneurial heritage

Drivers:

⇒ Application of communication/ collaboration skills
⇒ Higher levels of technological innovation
⇒ Infrastructural upgrades
⇒ Government as a facilitator – e-government and incentives for investment but largely driven by commerce
⇒ Reliant on private sector
⇒ ICT catering for needs in business, communication and education
⇒ Location – physical/ historical
⇒ Virtual – high bandwidth in place
⇒ Cultural – languages, brokerage skills

Prof. Ian Miles suggested that the same elements were discussed in each of the groups. Thus one must decide where the priorities lie, in order to generate a scenario of what actions could be taken in the near future for Malta.

Rating the relative importance of each driver:

Technology (especially global ICT trends)	**(3)**
Governance	**(25)**
• **Political process (stop/go, long-term)**	**(17)**
• **Policy-making (openness, transparency, timeliness, dialogue with stakeholders**	**(8)**
Social/ Cultural	**(15)**
• **Values including religious**	**(2)**
• **Cooperation , sharing of knowledge**	**(6)**
• **Acceptance of Innovation**	**(2)**
• **Risk and entrepreneurial attitudes**	**(5)**
Linkages to Europe and region	**(5)**
• **Region**	**(5)**
• **Worldwide**	
Industry/Economic	**(9)**

- **Situation in global environment (1)**
- **Provision of finance for innovation (7)**

Human Resources
- **Underutilisation (5)**
- **Brain drain**

Structures of the Education System and Research (12)
- **Academic /industry linkages (9)**
- **Generation of Innovation and Research (2)**
- **IPR (1)**

Infrastructure and Environment (3)
- **Tourism**
- **Costs of growth (energy, building etc…..) (3)**

Summarizing the Importance of the Drivers	
Technology	**3**
Governance	**25**
Social/ Cultural	**15**
Linkage to Europe and Region	**5**
Industry/ Economic	**9**
Human Resources	**5**
Education System (and research)	**12**
Infrastructure and Environment	**3**

Discussion:

A few of the points raised during the discussion:

When looking at the main drivers, one must consider what type of change can occur in each and the capacity there is to create change.

- It is important to identify sources of change outside government

- One must identify suitable levers to bring about change
- None of the top four drivers lie in a reactive situation (major components are mixed). Thus there is scope for change.
- Infrastructure must cope with on-going development to keep pace with change

Policy suggestions for various scenarios:

- Valorizing Malta and its strengths
- Policy for better use of ICT (virtual Malta)
- Policies in education leading to reform (new academic-industry links; international links and standards)
- Fiscal and financial policies (tax reliefs for training)
- Industry (cluster support policies)

Leveraging change by targeting potential change agents and tools:

- New knowledge : publications….
- Visionary individuals
- Conferences/ workshops/
- Networks
- Projects (pilots)
- Change agencies
- Children
- Media
- …….

Annex 1: Workshop Programme

Target Audience:
This workshop is targeted mainly at the members of the Malta eFORESEE ICT Expert Panel and key members of the Malta eFORESEE biotech and marine/environment pilot panels.

Invited Speaker:

Prof Ian Miles, ***Professor of Technological Innovation and Social Change***
Director of PREST
Director of ESRC Centre for Research on Innovation and Competition
University of Manchester

Thursday 29 August
Opening Session

13.00 Introduction of speaker and participants
13.15 Presentation on Information Society trends by Prof Ian Miles
14.15 Questions and interventions by the participants

15.00 Break

15.30 Continuation of discussions
16.30 Conclusions

Friday 30 August

09.30 Introduction on Scenarios by Prof Miles

10.15 Presentation on Malta Scenarios proposed to date by Ms Yasmeen Ariff

11.00 Break

11.30 Introduction to Practical Session

12.30 Lunch

13.30 Practical Session on Scenario-building

15.00 Break

15.30 Continuation of Practical Session

16.30 Conclusions

It is important that you confirm your participation in this workshop, by sending an e-mail to jharper@mcst.org.mt

Ian Miles BSc

Professor of Technological Innovation and Social Change

Director of PREST
Director of ESRC Centre for Research on Innovation and Competition

Ian Miles graduated in psychology from the University of Manchester. After working at the Science Policy Research Unit at Sussex University for eighteen years, he joined PREST in 1990. His research interests are broad ones, as are the range of methodologies he applies. Much of his work on technological innovation has concerned new Information Technologies, and he has been particularly interested in service industries as users and sources of innovation. He has also carried out work on 'clean' technologies and on the social and

employment implications of changing technology. Other interests include the evaluation of social science and environmental research programmes, social indicators, and forecasting methods. As well as being a Director of PREST, he is also a Director of the ESRC Centre for Research on Innovation and Competition, in which PREST is the leading partner.

His work has been carried out for many sponsors, including the Economic and Research Council, UK government departments (DTI, DoE), foreign government departments (in Brazil, Switzerland), international organisations (e.g. the EC, World Bank, UNCTAD) and private companies (e.g. BT, Royal Mail). As well as producing numerous reports, he has written around one hundred journal articles and book chapters, and authored and co-authored twelve books, and co-edited several more, the latest of which is *Knowledge and Innovation in the New Service Economy* (Elgar, November 2000).

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Annex 2: Workshop Participants

eFORESEE - Knowledge Futures in ICT Pilot
JULY 2002

Participants' List for Scenario Workshop - 29-30th August 2002

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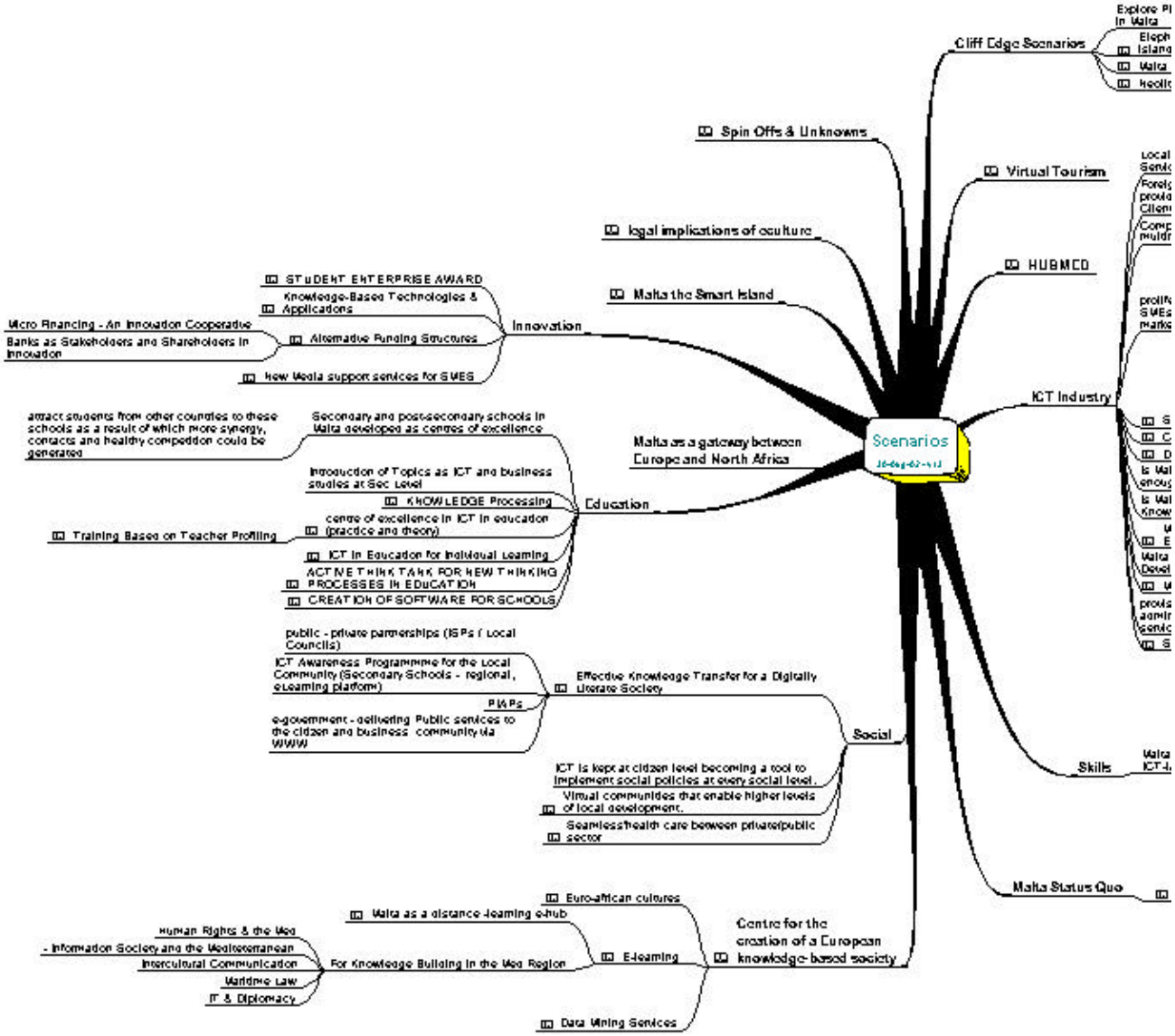
Annex 3: Scenarios
Prepared by Ms Yasmeen Ariff



1. Cliff Edge Scenarios

1.2 Elephant island

..Malta will be developed as a world centre where great ideas come to die. It would serve like an elephant cemetry for good ideas...

1.3 Malta Yuk

... this scenario has a Turkish flavour in that continuing and investing in zero-sum culture we create a black hole in the centre of the Mediterranean which sucks in all that we have achieved and compact it into a tennis ball and by so doing let the region get on with its development and save the European Union a lot of money and heartache.

1.4 Neolithic Malta.

...freeze development and continue mismanaging the human resource talent of this island

..expand Magthab from land fill to a seafill ....with an overhead terrestrial fill.... then promote the island as a global museum of neolithic governance. the idea is to carve our success in stone and be a beacon of failure for a thousand years.

2. Virtual Tourism

Something new which could increase our dimension internationally is the creation of an ON-LINE visit to some (if not all) of our historical sites. Visitors could be led through a virtual walkthrough of our unique sites (say our Hypogeum,Hagar Qim or the Imnajdra temples) and people who would then be interested in seeing the place in person, could be invited over to our country to do so.

3. HUBMED

...with increase in the momentum of globalisation Malta will be developed into a regional hub for political, cultural, educational and business services for the Mediterranean Region. A broker of peace and sustainable development between the European Union, The United States the African Union and China directing development into the North African and Middle Eastern countries.

4. ICT Industry

4.5 Self Sustaining ICT Sector

Self-Sustaining ICT sector - where the sector of ICT will be able to exist on its own two feet, get the investment it requires (something more sustainable than the 1million techy fund please!!), and use resources from our island without the need to import brains from abroad. I would classify this as a GOOD scenario!

4.6 Copy Cat ICT sector -

Copy Cat ICT sector - where ideas are not new but simply copied over from foreign counterparts and redistributed. The Piracy industry would be in its golden era and people would not appreciate innovations... they would just stick labels saying "Made in Malta" on any copied concept they use!
This would be BAD

4.7 Dinosaur Maltese ICT

Dinosaur Maltese ICT (to carry on the Animal Farm after Joe's elephants) - where local software developers are registering as unemployed as there is no more need for them. Microsoft has bought the country and has changed Malta into Microsoftland.
Work is carried out in Seattle anyhow and only tax consultants have some serious work to do. On the bright side, we all have a free laptop and a little chip grafted inside our skin (Intel inside) which becomes flourescent in the dark and one can easily discern "Microsoftland Serial number:1234-ehwd certificate of authenticity!" :-)
Do I need to tell you that this would be UGLY??

4.10 Malta as an Open Source Centre of Excellence

-Introduction & Background

Open Source Software is a form of software development where the developer(s) freely share the source code of their software. This practice initially seems counterintuitive -
Giving away the source code of your software is like giving away the secrets of how your product works - giving all your competitors immediate access to your work.

However, closer examination of the community of Open Source developers, the business models of organisations that develop and support open source software as well as the significant interest and commitment of major player in the global ICT field (IBM invested to the tune of $1 billion in Open source Software, Sun Microsystems made available the sourcecode to StarOffice - at a cost of roughly $30 million, to name but a
few) reveals that Open Source software simply makes business sense. Some well-known examples of software produced by the Open Source community are the GNU/Linux operating system, the OpenOffice.org office suite (full replacement of Microsoft
Office - free of charge), the Apache webserver (in use by over 60% of the worlds' websites - even www.eforesee.info runs on Linux and Apache) and many others.

The true revolution in terms of software development is the shift of the software development paradigm from a manufacturing-based industry to a services-based industry.
This is significant, since the software development process is one where the base material for the manufacturing of product are thoughts, ideas, concepts, and other "intangibles". These base materials make an uncomfortable fit at best with the traditional manufacturing paradigm.

However, these same base materials make a very good fit with the services industry, as does indeed that whole concepts behind the need and values underpinning the ICT field. So the shift of software development from a manufacturing paradigm to a services-based paradigm is not so much of a revolution as it is a natural gravitiation to the place it belongs.

Our website offers more information on Open Source Software:
http://cimu.gov.mt/architecture/index.html

- Malta and Open Source Software

Malta, as well as other small nations, have a unique opportunity with Open Source software, and the widening acceptance of Open Source software and the Open source
Development model as a mainstream force in modern ICT.

Open Source software has an almost zero barrier to entry for organisation, due to the following reasons:

* inherent accessibillity to the full creation process, the direct contact with the individuals that wrote the sourcecode, and the overall mentality of free sharing of information.

* The only tools required to participate in the community are a healthy attitude, a PC (costly OS not required - one can opt to use Linux - there are many user friendly distributions available), and an Internet connection.

* Information about the many aspects of opensource software and the community that supports it is readily available all over the Internet - free of charge.

Any person or organisation with the predispostion and tools can for part of this community, learn from it, and subsequently assist organisations in the use and implementation of Open Source software - low investment = low barrier to entry. This in contrast to providing similar services for "established" products.

An example case in point would be an organisation that wishes to provide professional services, support, and advice on Office Suites to organisations.

* An organisation that wishes to provide advise and support services for Microsoft Office would require a hefty up-front investment. Entry into Microsoft's partner programs is not cheap. One requires a minimum of 3 staff members to be MCSE certified - a proprietary training course that is costly, and only teaches the participant to use Microsoft products, and teaches little about the general design, operation and maintenance of ICT tools in general. The only true net beneficiary of the MCSE (and related schemes) is Microsoft. Only then can an organisation gain access to the tools and information required to deliver professional, high quality support and advise on Office suite implementation. Moreover, smaller business are actively discriminated against through the partner level scheme - the requirements for entry listed here are for a minimal level of access

to tools and resources. Larger organisations (with more MCSE's and higher budgets) can buy their way into higher levels of "partnership" with Microsoft, and thus gain access to better tools and resources, allowing them to operate more effectively and efficiently then the small market-entrant.

* On the other hand, one may opt to deliver the same services for supporting OpenOffice.org - a fully featured, OpenSource replacement for Microsoft Office that delivers full file compatibillity with MS Office and works in a similar way and offers similar features. An organisation would not need enroll staff in an expensive course, would not require special "partnering programs" and would not be discriminated against in favour of larger organisations, and would still have access to all the tools and information that one would receive in a high-level partner program from a closed-sourced operator. The benefits, however, extend beyond what any closed-sourced operator can offer due to the inherently restrictive nature of their business and manufacturing model. Due to the availibillity of source code, one can translate OpenOffice.org to sport a user interface in the users native language - for example, work is currently underway to provide a Maltese version of OpenOffice.org - spellcheck, user interface and all. This matches nicely with Linux - already the Linux user interface is available in Maltese. Closed source businesses will never provide a user interface - a market of 200.000 units is simply to small to fit in their business models. Open Source has another advantage here.

This is just a small example of how opensource and micro economies work well together - there are many, many more.

-Malta as a centre of excellence for Open Source software

Due to the ready access to all levels of information regarding the open source global body of code, information, best practices coupled with the extremely low economic barrier to entry into the particular market, Malta is in a better position to become a centre of excellence for providing services around Open Source software. The EU is moving towards Open Source software, as are major commercial organisations.

These are just some very high-level conclusions that we are drawing from ongoing research we have been performing for the past 10 months on Open Source.

The Univeristy of Maastricht recently published the FLOSS report that gives more background on various economic aspects of Open Source Software.

http://www.infonomics.nl/FLOSS/report/

4.12 Malta being a hub in the provision of services

Also, this could also lead to Malta being a hub in the provision of services (ISP, ASP, NSP, and so on), especially providing Software as a service or Application Service Provision (ASP)

4.14 Service Provider to the Games Industry

Program development for entertainment gaming consoles such as Sony PlayStation, X-Box, Nintendo, etc. This industry is huge – there are about 30,000 PlayStations in Malta alone. Of

course, development of gaming programs involves much more than software development, but also great visuals, filming, sound, story writing, etc.

6. Malta Status Quo

6.1 Low Risk Evolutionary Plans that deliver

further investment in ICT applics, knowledge and skills to help us do what we currently do, but better and more effectively, although maybe not a terribly exciting proposition, is certainly a positive scenario.

Today, everybody believes in the value of ICTs, but that does not mean that any idea should be taken on and that any investment in ICT gives a guaranteed return. The dot.com and telecoms bubbles are current painful history.

So although, big broad vision stuff is OK, it often makes more sense to go for building on what you have and convincing decision makers and stakeholders with low risk evolutionary plans that deliver tangible scalable objectives within forseeable timeframes.

7. Centre for the creation of a European knowledge-based society

ICT is much more European in dimension. It seems that currently, most software and therefore IT education, knowledge and even thought processes are based on US creations. A possible scenario would therefore be Malta being a centre (or playing a central role) for the creation of a European knowledge-based society where all the various European cultures (particularly north and south) are brought together to create and advance a European thought-process, which is undeniably different from an American process.

7.1 Euro-african cultures

Africa offers some fascinating opportunities in software development and bridging the digital divide initiatives..

7.2 E-learning

SmartForce SIGNS $4.1M CONTRACT WITH TELUS CORPORATION
- E-learning company SmartForce has signed a multi-year $4.1m contract with Telus Corporation, a Canadian telecom company. The agreement, which is an upgrade on a contract signed in 2000, will see Smartforce provide e-learning to 5,000 information technology professionals at Telus. Telus said it selected SmartForce to keep its employees current on evolving technologies and to increase the number of technical certifications attained by employees. Employees will use the MySmartForce learning platform to access content aimed at promoting the company's growth in data and IP services. Telus is the leading service provider in Western Canada. It also provides data,

Internet, voice and wireless services to Central and Eastern Canada.
Related website: http://www.smartforce.com

7.2.1 Malta as a distance -learning e-hub

I would like to see Malta as a distance -learning e-hub,capitalising on mixed,distance-learning and on-site educational programmes,combined with use of English, which is a differentiator. This could be in conjunction with overseas partnership-which could be used to open up opportunities for local people e.g. sabbaticals facilitated within these partnerships.Obviously this would have to be adequately resourced, with due attention paid to international competition.I think that long-term this should prove to be an income generator for Malta.

7.3 Data Mining Services

Providing research and analysis on client defined areas

8. Social

8.1 Effective Knowledge Transfer for a Digitally Literate Society

effective KNOWLEDGE Transfer

Digitally literate society- usage of ICT will propagate across all strata of society, irrespective of income, level of education, physical ability etc... working towards the eradication of the digital divide

8.3 Virtual communities that enable higher levels of local development.

Virtual communities that enable higher levels of local development e.g. having all our professionals trained to be able to meaningfully participate.For example,within medicine,the ability of all our doctors to participate and have access to the latest developments-or even better have systems in place enabling practice to reach the highest levels..This would require access to knowledge databases at present,and in future,decision support.

8.4 Seamless'health care between private/public sector

to develop seamless' care between private/public sector, University and government. For this to occur there has to be a global vision developing this -preferably from the end-user perspective.

e.g. the development of an electronic patient record on a smart card,that would be accessible to all authorised users allowing for issues such as confidentiality.

9. Education

9.3 KNOWLEDGE Processing

Emphasis placed on Thinking Skills, Innovation and Leadership

9.4 Centre of excellence in ICT in education (practice and theory)

This implies a situation where all teachers are making the best possible use of ICT in order to enhance teaching and learning in all areas of the curriculum and at all levels of our education system (primary, secondary, post-secondary and tertiary). This vision includes making most of the communication capabilities of current and future technology in order to promote learning at a distance and at all times of the day (e-learning) and at facilitating communication between parents/guardians and the school. It also implies a situation where Malta develops innovative ways of making use of ICT in our classrooms. Once such a vision is in place we can become a Mediteranean centre of excellence in teacher education in this area. We can then offer appropriate University level courses mainly through distance learning.

9.4.1 Training Based on Teacher Profiling

Once we are looking scenarios that can ensue in 10 years time it means that there will be today's forty year old teachers still in the education system. Evidently these teachers do not all come from the IT culture in the same way as younger teachers will be. Again I do not believe that once education in the wide sense of the word becomes more IT based it would automatically mean strict standardisation of teaching practices.

The scenario I see is that teacher training becomes focused on different kinds of teachers who can cater for different kinds of teaching and different kinds of methods of teaching in the different kinds of teaching. Sounds complicated so I will simplify it. There will obviously be different kinds of teaching, example, for primary, for secondary, for online teaching of business practices, online teaching of languages, IT based training in design etc. In each of these different kinds of teaching, although all maybe IT based, there will be different methods of teaching depending on the kind of market or student population, depending on age groups, on the subject specialisation, on the software used in the kind of teaching - maybe it will not be Windows as we know it today ! THE SCENARIO THAT I CAN IMAGINE IS THAT INDIVIDUALS WANTING TO OPT FOR THE
TEACHING PROFESSION CAN BE PROFILED AND CAN BE TRAINED FOR ONE OF THE
DIFFERENT KINDS OF TEACHING FIRST AND SECONDLY FOR THE SPECIFIC METHOD OF
TEACHING ONE WANTS TO OR IS APT TO PRACTICE IN.

Following a Council of Europe initiative a language passport has been designed for students to facilitate classification or profiling of the language abilities of students. In this passport or, as it is called, language portfolio, one has schools attended, training in the various languages and the method of teaching used etc. Today we are speaking of IT techinicians' driving licence, in the future I can see teachers' driving licences for facilitate mobility between European countries and mobility from one employer to another thanks to this profiling of teachers.

9.5 ICT in Education for Individual Learning

to develop a system which will evolve the present system of education (exam based) into one which will take into consideration the special needs of 'individual' students

National Minimum Curriculum makes reference to introducing formative assessments as part of a school's delivery mechanism.

In many cases, exams are actually detrimental to our children, and instead of achieving the desired target of 'educating' our children, are actually harming them by focusing on getting the students 'through' exams.

The major problem with today's system is that it does the exact opposite of what such a system is supposed to do ie instead of the system being made to fit the student, the student is being forced to fit the system.

I would categorise students into three main groups, a) bookworm, b) learning by observation, c) learning by 'hands-on'.

The present system caters for only the bookworm (as we all know), and all other students end up falling through the net, and in most cases being branded as failures. This branding of students occurs at as early an age as 5-6 years.

The advent of ICT presents us with a unique opportunity to design a case study, eg take the syllabus of one particular subject in one particular year and present the same syallabus in three different formats to suit all groups of students (ie one format will address the bookworm and may not differ considerably from today's presentation method, but the other two would of course ensure that the student learns by using techniques customised to that particular group). The use of computers will be the fulcrum of delivery of curriculum.

Of course, proper tests are to be designed in order to be able to categorise students properly.

In this manner, one could use this case study on a group of students from a particular school (willing to participate), and results (statistics) could then be used and compared in order to gauge success (or failure) of the project.

9.6 ACTIVE THINK TANK FOR NEW THINKING PROCESSES IN EDUCATION

MALTA CAN BECOME AN ACTIVE THINK TANK FOR NEW THINKING PROCESSES IN EDUCATION IN GENERAL, PARTICULARLY FOR LIFELONG LEARNING.

9.7 CREATION OF SOFTWARE FOR SCHOOLS

MALTA CAN EXCEL IN THE CREATION OF SOFTWARE CREATION FOR SCHOOLS BASED ON NEW THINKING AND TEACHING METHODOLOGIES. WE ARE USED TO THE IDEA OF SILICON VALLEY BECAUSE IT HAS

PRODUCED EMPLOYMENT OPPORTUNITIES AND FOREIGN INVESTMENT BUT SHOULD MALTA WANT TO EXCEL IN EDUCATING

- BE IT IN EDUCATION OR IN THE CREATION OF NEW THINKING PROCESSES
- WE CAN TAIL SUCH AN IDEA OF A SILICON VALLEY BY FOCUSING ON MAN POWER INVESTING ENERGY IN CREATING SOFTWARE FOR SCHOOLS IN A WIDE SENSE OF THE WORD.

AS AN EXAMPLE ONE CAN TAKE THE BUSINESS CONCEPT OF WALL STREET SCHOOLS OF ENGLISH. IN THESE ENGLISH LANGUAGE SCHOOLS STUDENTS BUY A MEMBERSHIP AND ONCE CAN GO TO SCHOOL FOR UNLIMITED HOURS UNTIL THE STUDENT ATTAINS THE LEVEL OF ENGLISH THE STUDENT NEEDS. THIS IS NOT A CHAIN OF SCHOOLS WHICH REQUIRES TRAVEL BUT IS INTENDED FOR LOCAL MARKETS.
THE SCENARIO I IMAGINE, THEREFORE WOULD BE THIS CONCEPT TRANSLATED TO ONLINE DISTANCE LEARNING WITH MALTA AS ITS BOUNCING BOARD WHERE TEACHER ASSISTED COURSES ARE RUN ONLINE FROM MALTA.

11. Innovation

11.1 STUDENT ENTERPRISE AWARD

FIRST STUDENT ENTERPRISE AWARD IN TRALEE IT
- The first Student Enterprise Award at the Institute of Technology in Tralee has been won by David Butcher, an MSc student in computing who has established a photography course on the internet. mr butcher, who has been joined in the venture by diarmuid moriarty, delivers courses to 200 students from all over the world who are tested in theory and practice and have an unlimited time in which to complete their studies. the student enterprise award is sponsored by kerry county enterprise board and shannon development. related websites http://www.schoolofphotography.com and http://www.ittralee.ie

11.2 Knowledge-Based Technologies & Applications

The above collectively indicate that in the future, Malta should be in a position to exploit besides other things, **Knowledge-Based Technologies & Applications**. This 'generic approach' could open up opportunities such as the '*development of intelligent systems'* for various application domains eg. business, engineering, medicine, education etc. Such a goal would entail besides other things exploiting *Artificial Intelligence (AI)* technologies & methodologies.

11.3 Alternative Funding Structures

Before an indigenous R&D and innovation culture can be fostered, there needs to be funding

11.4 New Media support services for SMES

Providing a full service from consultancy to implementation of online trading

12. Malta the Smart Island

Smart Island Scenario

Sometime after the World Summit on sustainable development, globalisation and the spread of narco-democracy brought about the collapse of the old order. A virtual civil war between 30,000 playstations, 80,000 personal computers 75,000 internet users and 240,000 mobile phones brought about the end of the old networking system. A new system of netweaving emerged.

The community re-generated itself into a public-private sector-community partnership and collaboration was the order that overcame zero sum. Enterprise governance was the new modality of government and the size of the island became a competitive advantage. Its geostrategic location at the centre of the Mediterranean was appreciated by all and inculcated into most strategic thinking.

The island community moved from a ghetto mentality to a global enterprise developing knowledge and applying knowledge efficiently and effectively to create sustainable development.

Space creation and creating enabling environments to empower the community became the order

of the day...

The eforsee initiative that was started 50 years ago had been the catalyst of all the above.

With hindsight, insight and foresight the island community managed to move forward into

a new space of peace and prosperity not just for themselves but for the whole Mediterranean

region.

13. legal implications of eculture

What I would like all of you to consider is the legal implications (as per human rights - right to privacy, freedom of expression etc..) of this eculture we're living in. we are becoming always more dependant on the cyberworld for our basic needs and duties. Say the filling up of the tax return will soon be possible online even for citizens (not just for companies), even love has become cyber oriented, business has already become and learning has also added the small e-prefix. and most probably other services will become electronically oriented. My question is: are we becoming a 1984 (George Orwell) global state? That is why I think we need to look at our Cyber laws and perhaps prepare ourselves (foresight) for what the citizen of the future (which is nearer than we imagine) will have to put up with.

This question appears to be philosophical - but it's not. We are already tiny cyber islands connected to each other via web. We live in this web and constantly express ourselves. We are part of this cyber corporatism - we should really think whether our scenaios (good or bad) will

ever become the ***telescreen*** through which Orwell's controlling agencies used to check on citizens?

14. Spin Offs & Unknowns

Why not try to shift attention to 'unknown' issues, like what would happen when our current will start being tackled seriously in the future? For example, what will be the effect on the market/society of measures taken to tackle the IT problems you all mentioned.

Annex 4: Objectives and Agenda for the
eForesee Exploratory Scenario Workshop (August 30, 2002)
prepared by Prof Ian Miles

Objectives

- Use scenario methods to explore issues confronting Malta in ICT - alternative pathways for ICT and its interaction with Maltese society and economy
- Provide orientation and inputs to action-oriented visions workshop
- Develop recommendations for sectors/applications/ key issues to explore in follow-up research and workshop.

Friday 30 August

9.30 Welcome

- Introduction to Scenario Analysis
- ***Review of Scenarios emerging from email discussion***

11.30 Four scenarios: plenary discussion, brainstorming

12.00 First Break outs: scenario development (characterising scenarios)

12.30 Lunch

13.30 Scenario Analysis Break-out groups (main drivers, policy implications)

15.00 Tea/Coffee

15.30 Plenary discussion: presentation of drivers and policy implications, analysis of priorities, discussion of main areas to focus next wrkshop on, etc.

16.30 Conclusions

Four Scenarios

Business as Usual/as expected (Best guess, extrapolation, surprise-free)

Hard times (major challenges, but not catastrophic collapse)

Onwards and Upwards (successful mastery of current trends)

Visionary/Paradigm shift (critical mass of stakeholders successfully pursue visionary/alternative directions

Break-Out Session 1: Tasks

- The main task now is to characterise your scenario. Remember that the main focus for this exercise is ICT- applications and implications as well as technologies.

You will need to appoint a rapporteur who can report back from your group to the plenary session .

- Are you happy with the brief description developed in the plenary? If not come up with another description of the scenario in not more than 100 words.

- Develop your own account of what this scenario might look like.

- Begin to think about the conditions that might bring this into being (drivers and shapers).

- What is a name for your scenario, if you were to be marketing it? (Greater Malta? Interface Island?)

Break-Out Session 2: Tasks

- The first task now is to provide more detail on the factors that would tend to lead to your scenario. You may find it helpful to undertake a STEEPV review, to make sure that you have covered a comprehensive range of factors. Have you considered factors that are:

  - SOCIAL
  - TECHNOLOGICAL
  - ECONOMIC
  - ENVIRONMENTAL
  - POLITICAL
  - VALUES

- Which are the mot important factors – choose the top 3 to 5 drivers as you see them, leading to your scenario or shaping what its major details are.

- How far are these factors **capabilities**? What would be the major capabilities required in Malta to make the msot of this scenario?

- What are the main implications for policy that arise? What has to be done to avoid the negative and facilitate the positive elements of this scenario? As an aide memoire, you might want to consider policies that focus on:
  - Education – could include human capital formation, University-industry liasion, etc.
  - Research, development, design – could include collaborations and alliances
  - Technology Transfer – could include awareness, consultancy, support to SMEs, etc.
  - Finance – could include venture capital, banks, foreign investment. Etc.
  - Other important areas – e.g. policies that affect trade, competition, etc.
- Are there strategic implications for other actors – University, firms in various sectors, etc.

- Assuming this scenario will occur, what are the 3 to 5 top priorities for policy now?

- Signposts: What would indicate movement toward this particular scenario, expressed, for example, as headlines in the media?

Please prepare a presentation on these issues for the plenary session.